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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,443	01/21/2004	Timothy P. Weihs	13631-46	3039

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LOWENSTEIN SANDLER PC
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EXAMINER

FISCHER, JUSTIN R

ART UNIT	PAPER NUMBER
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1733

MAIL DATE	DELIVERY MODE
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06/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/761,443	Applicant(s) WEIHS ET AL.	
	Examiner Justin R. Fischer	Art Unit 1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18, 40-42 and 44-80 is/are pending in the application.
- 4a) Of the above claim(s) 40-42 and 61-80 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18 and 44-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 6, 2007 has been entered.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
- I. Claims 18, 40-42, and 44-60, drawn to a product including a reactive multilayer foil having a heat of formation more negative than -30 kJ/mole-atom and a thickness of at least $60\text{ }\mu\text{m}$, classified in class 428, subclass 139.
 - II. Claims 61-72, drawn to a product having a reactive multilayer foil and at least one layer of fusible material having a thickness of at least $20\text{ }\mu\text{m}$, classified in class 428, subclass 139.
 - III. Claims 73-78, drawn to a product having a wetting adhesion layer and a reactive multilayer foil, wherein said multilayer foil has a heat of formation more negative than -30 kJ/mole-atom, classified in class 428, subclass 139.

- IV. Claims 79 and 80, drawn to a product including a reactive multilayer foil and at least one layer of gold, classified in class 428, subclass 139.
3. Inventions I and II are related as different inventions, each having a unique and separate means for establishing patentability. In this instance, Invention I requires a multilayer foil having a thickness of at least 60 μm and a specific heat of formation, both of which are not required by Invention II. Invention II, on the other hand, requires a layer of fusible material having a thickness of at least 20 μm - such a limitation is not required by Invention I. As such, it is evident that the claims are directed to patentably distinct subject matter and restriction is proper.
4. Inventions I and III are related as different inventions, each having a unique and separate means for establishing patentability. In this instance, Invention I requires a multilayer foil having a thickness of at least 60 μm , which is not required by Invention III. Invention III, on the other hand, requires a wetting/adhesion layer- such a limitation is not required by Invention I. As such, it is evident that the claims are directed to patentably distinct subject matter and restriction is proper.
5. Inventions I and IV are related as different inventions, each having a unique and separate means for establishing patentability. In this instance, Invention I requires a multilayer foil having a thickness of at least 60 μm and a specific heat of formation, both of which are not required by Invention IV. Invention IV, on the other hand, requires at least one layer of gold between a first and second body- such a limitation is not required by Invention I. As such, it is evident that the claims are directed to patentably distinct subject matter and restriction is proper.

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6. Inventions II and III are related as different inventions, each having a unique and separate means for establishing patentability. In this instance, Invention II requires a layer of fusible material having a thickness of at least 20 μm - such a limitation is not required by Invention III. On the other hand, Invention III requires a heat of formation more negative than -30 kJ/mole-atom , which is not required by Invention II. As such, it is evident that the claims are directed to patentably distinct subject matter and restriction is proper.

7. Inventions II and IV are related as different inventions, each having a unique and separate means for establishing patentability. In this instance, Invention II requires a layer of fusible material having a thickness of at least 20 μm - such a limitation is not required by Invention IV. On the other hand, Invention IV requires at least one layer of gold between a first and second body, which is not required by Invention II. As such, it is evident that the claims are directed to patentably distinct subject matter and restriction is proper.

8. Inventions III and IV are related as different inventions, each having a unique and separate means for establishing patentability. In this instance, Invention III requires a heat of formation more negative than -30 kJ/mole-atom , which is not required by Invention IV. On the other hand, Invention IV requires at least one layer of gold between a first and second body- such a limitation is not required by Invention III. As such, it is evident that the claims are directed to patentably distinct subject matter and restriction is proper.

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9. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

10. Newly submitted claims 61-80 are directed to an invention that is independent or distinct from the invention originally claimed as detailed above.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 61-80 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. Claims 55 and 59 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention. In particular, the original disclosure fails to suggest a multilayer foil comprising aluminum oxide.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 18, 44-50 and 52-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makowiecki (US 5,381,944, of record) and further in view of Weihs (Self Propagating Reactions in Multilayer Materials, of record). Makowiecki substantially teaches the product of the claimed invention, including a reactive multilayer foil disposed between a first 10 and second body 11. In describing the reactive multilayer, Makowiecki suggests the exemplary use of alternating layers of titanium (Ti) and boron (B), wherein the respective materials react in an exothermic reaction (Column 2, Lines 60+ and Column 3, Lines 20-30). While the reference fails to expressly describe the heat of formation of such a reaction, Weihs provides evidence that such materials (Ti and B) have a heat of formation that is more negative than -30 kJ/mole-atom (Table F7.1). Makowiecki, however, fails to expressly teach a reactive foil having a total thickness of at least 60 μm . One of ordinary skill in the art at the time of the invention would have found it obvious to use a foil having a thickness of at least 60 μm in view of the general disclosure of Makowiecki. In particular, the reactive foil of Makowiecki is formed as a multilayer assembly, wherein each layer has a thickness

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between 1 and 10 μm (Column 2, Lines 55-65). A fair reading of Makowiecki suggests the use of reactive multilayer foils having a wide range of thicknesses, including those above 60 μm , there being no conclusive showing of unexpected results to establish a criticality for the claimed values. It is noted that the example in Column 3, Lines 65+ is exemplary and the reference fails to expressly teach away from using foils having a thickness in accordance to the claimed invention. Lastly, the specific dimension of the foil would be a function of the materials being bonded (Column 1, Lines 15-30).

With further respect to the thickness of the reactive foil, it is emphasized that the claims are directed to a product by process and the limitations regarding the process do not further define the structure of the claimed product (applicant has failed to demonstrate that reactive foils having the same thickness and formed in a different manner (freestanding versus sprayed) result in a materially different product).

With respect to claims 44-46 and 48-50, Makowiecki teaches a wide range of applications, including electronic materials and component and integrated circuits (Column 1, Lines 15-30). One of ordinary skill in the art at the time of the invention would have recognized such language as including microelectronic devices and semiconductors. With specific respect to claim 45, the method of Makowiecki is not solely directed to bonding a first and second body formed of the same material and as such, the method of Makowiecki would include methods in which different materials satisfying the claimed invention are used.

Regarding claim 52, the assembly of Makowiecki includes alternating layers of fusible material, such as aluminum (Column 2, Lines 65+).

With respect to claims 53-60, as detailed above, Makowiecki suggests the exemplary use of a multilayer film formed of Ti and B (Column 2, Lines 60+). One of ordinary skill in the art at the time of the invention would have readily appreciated the use of a wide variety of films formed of materials having a negative heat of formation (exothermic reaction). In particular, a wide variety of materials are recognized as being equivalent alternatives in the sense that they have a negative heat of formation, as shown for example by Weihs (Table F7.1). It is emphasized that the method of Makowiecki includes the language "such as" when describing the use of Ti and B, further suggesting the use of additional materials.

15. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Makowiecki and Weihs as applied in claim 47 above and further in view of Sindt (US 402, of record). Makowiecki discloses a structure as discussed above, but the reference is silent as to the foil having apertures. Sindt discloses two bodies joined by a bonding foil, wherein said bonding foil 409 comprises openings 411 (Figure 10). The openings of the foil allow for direct contact between the two bodies, thus producing a better bond (Column 4, Lines 15-23). One of ordinary skill in the art at the time of the invention would have found it obvious to include openings in the reactive foil of Makowiecki in order to produce a structure having a high degree of adherence.

Double Patenting

16. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct

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from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

17. Claims 18 and 44-60 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 40-43, 50, and 51 of copending Application No. 10/898,650 in view of Makowiecki. The relevant rejection has been previously applied in the Final Rejection.

This is a provisional obviousness-type double patenting rejection.

18. Claims 18 and 44-60 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 14 and 20 of copending Application No. 10/976,877 in view of Makowiecki. The relevant rejection has been previously applied in the Final Rejection.

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

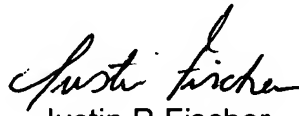
19. Applicant's arguments filed June 6, 2007 have been fully considered (see above rejections) but they are not persuasive.

Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R. Fischer** whose telephone number is **(571) 272-1215**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Justin R Fischer
Primary Examiner
Art Unit 1733

JRF
June 11, 2007